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Multidisciplinary Management of Lumbosacral Spina Bifida in Neonate: A Case Report from Manyara Regional Referral Hospital, Tanzania

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Abstract

Spina bifida is a congenital neural tube defect that results from incomplete closure of the embryonic neural tube during early fetal development. Myelomeningocele is the most severe form and is commonly associated with neurological impairment and hydrocephalus. This case report describes the management of a neonate diagnosed with lumbosacral myelomeningocele associated with hydrocephalus at a Regional Referral Hospital in Tanzania.

A seven-day-old male neonate was referred from a district hospital presenting with a cystic swelling over the lower back since birth. Clinical examination revealed a 6 cm × 5 cm lumbosacral swelling with cerebrospinal fluid leakage, lower limb weakness, and poor anal tone. Cranial ultrasound demonstrated moderate hydrocephalus. The patient underwent surgical repair of the myelomeningocele and received prophylactic antibiotics and supportive neonatal care. Follow-up evaluation showed satisfactory wound healing and improvement in clinical condition.

This case highlights the importance of early diagnosis, timely referral, multidisciplinary management, and preventive maternal folic acid supplementation in reducing complications associated with spina bifida in resource-limited settings.

Keywords: Spina bifida, myelomeningocele, hydrocephalus, neural tube defect, Tanzania, case report

1. Introduction

Spina bifida is a congenital neural tube defect (NTD) resulting from incomplete closure of the neural tube during the first four weeks of embryonic development, leading to varying degrees of malformation of the vertebral column and spinal cord [2] [10]. It is among the most common congenital anomalies affecting the central nervous system worldwide and remains a significant contributor to neonatal morbidity, long-term disability, and mortality, particularly in low- and middle-income countries where access to specialized care is limited [1] [9]. Clinically, spina bifida is categorized into spina bifida occulta, meningocele, and myelomeningocele, with myelomeningocele being the most severe form due to

herniation of both meninges and neural tissue through the vertebral defect [2] [10]. Affected neonates may present with neurological deficits, bowel and bladder dysfunction, orthopedic deformities, hydrocephalus, and recurrent infections depending on the level and severity of the lesion [9].

The etiology of spina bifida is multifactorial and involves complex interactions between genetic, environmental, and nutritional factors. Maternal folate deficiency remains one of the most established modifiable risk factors associated with neural tube defects [3] [8]. Other recognized risk factors include maternal diabetes mellitus, obesity, hyperthermia during early pregnancy, exposure to teratogenic medications such as valproic acid, poor antenatal nutritional status, and genetic predisposition [2] [10]. The World Health Organization recommends routine folic acid supplementation before conception and during pregnancy as part of comprehensive antenatal care to reduce the occurrence of neural tube defects and improve maternal and neonatal outcomes [7]. However, in many developing countries, delayed initiation of antenatal care, inadequate nutritional supplementation, and limited awareness regarding folic acid use continue to contribute to the persistence of preventable neural tube defects.

Early diagnosis and timely multidisciplinary management are essential in reducing complications and improving survival outcomes among neonates with spina bifida. Management often involves coordinated care among neonatologists, neurosurgeons, pediatricians, nurses, physiotherapists, and rehabilitation specialists [9]. Surgical closure of the defect is recommended as early as possible after birth to minimize the risk of infection, cerebrospinal fluid leakage, meningitis, and progressive neurological deterioration [2] [10]. Advances in fetal surgery have demonstrated that prenatal repair of myelomeningocele may improve neurological outcomes and reduce the need for ventriculoperitoneal shunting compared to postnatal repair, although such interventions remain largely inaccessible in resource-limited settings [4] [6]. Consequently, postnatal surgical repair remains the standard management approach in many low-resource countries, including Tanzania [5].

In sub-Saharan Africa, the burden of congenital anomalies is increasingly recognized as an important public health concern; however, access to specialized neonatal neurosurgical services remains limited [1]. In Tanzania, there are few published reports describing the presentation, management, and outcomes of neonatal spina bifida cases managed at regional referral hospitals, particularly in resource-constrained environments. Documentation of such cases is important for strengthening clinical learning, improving multidisciplinary neonatal surgical care, and contributing to the growing body of local evidence on congenital anomaly management. This case report therefore presents the clinical presentation, surgical management, and short-term outcome of a neonate diagnosed with spina bifida managed in a regional referral hospital setting.

2. Case Presentation

2.1. Chief Complain and Present of current illness

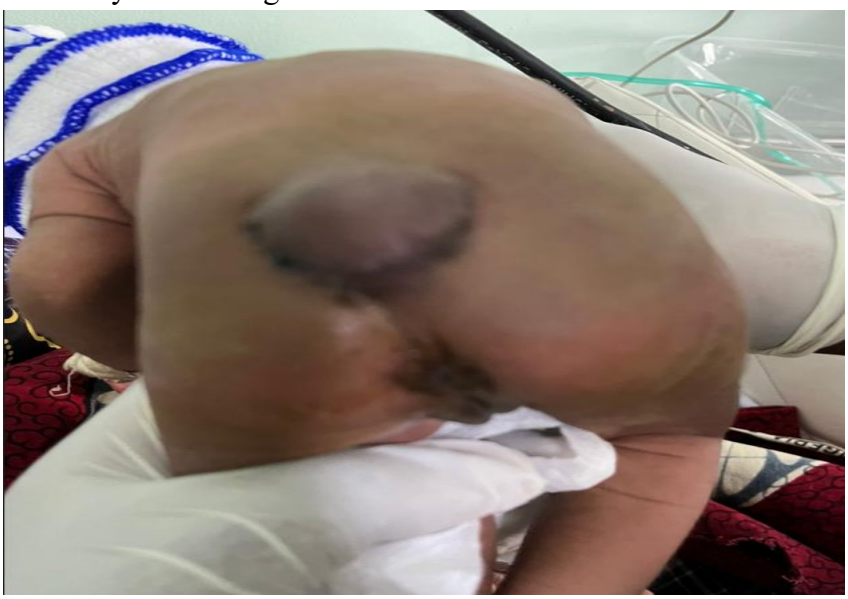
A one-day-old female neonate, referred to as B/O T.J.O, was admitted on 30 January 2026 with a chief complaint of lower back swelling noted since birth. She was referred from Magugu Hospital, The swelling appeared as a sac-like protrusion in the lumbosacral region, which was soft, cystic, and covered partially by a thin membrane. There was no active bleeding, and cerebral spinal fluid leakage. After being delivered

via spontaneous vaginal delivery at 38 weeks of gestation. The neonate had a birth weight of 2.0 kg, cried immediately after delivery, and achieved Apgar scores of 9 and 10 at the first and fifth minutes, respectively. The baby had passed urine and meconium appropriately after birth. There was no history of fever, convulsion, difficulty in breathing, cyanosis, lower limb weakness, or trauma during delivery. Antenatal history revealed that the mother initiated antenatal clinic attendance at 24 weeks of gestation and completed four visits. Throughout pregnancy, maternal blood pressure and blood glucose remained within normal ranges. Serological investigations showed non-reactive VDRL, negative MRDT, negative hepatitis B screening, and blood group O positive. She received routine antenatal interventions including ferrous sulfate and folic acid supplementation, sulfadoxine-pyrimethamine, mebendazole, prevention of mother-to-child transmission (PMTCT) services, and two doses of tetanus toxoid vaccine. No history of maternal diabetes, alcohol intake, smocking, radiation exposure or use of teratogenic drugs during pregnancy. Antenatal ultrasound was not done.

2.2. Clinical Findings and Diagnostic Assessment

On admission, the neonate was awake, active, and not pale, jaundiced, or cyanosed. No dysmorphic features were observed. Examination of the anterior fontanelle revealed a diamond-shaped fontanelle measuring approximately 5 × 6 cm, while the posterior fontanelle was triangular measuring 0.8 × 2 cm; both were neither bulging nor sunken. Vital signs showed oxygen saturation of 97% on room air, pulse rate of 156 beats/minute, respiratory rate of 52 cycles/minute, temperature of 36.6°C, and random blood glucose of 4.3 mmol/L. Anthropometric measurements included birth weight of 2.0 kg, length of 55 cm, and head circumference of 35 cm. Local examination demonstrated a lumbosacral swelling measuring approximately 6 × 12 cm with an intact sac-like covering containing visible straw-colored fluid without leakage. No neurological deficits were identified, and lower limb movements were preserved. A working diagnosis of spina bifida without associated congenital abnormalities was made.

Photo 1: Condition of a baby before surgical intervention



Initial management included nursing in prone position, sterile moist dressing of the sac twice daily, intravenous ampiclox 200 mg twice daily, and intravenous gentamicin 10 mg once daily as prophylactic

antibiotics. During subsequent multidisciplinary ward reviews conducted on 2nd and 3rd February 2026 involving specialists, registrars, intern doctors, and nurses, the neonate remained clinically stable with no new complaints. Serial examinations consistently demonstrated that the patient was alert, hemodynamically stable, and without neurological deterioration or signs of infection. Planned investigations included cranial and abdominal pelvic ultrasonography done which revealed normal findings, Echocardiograms (echo) and chest radiography done which revealed normal findings, in preparation for surgical intervention. Laboratory investigations revealed hemoglobin of 19.3 g/dL, white blood cell count of 12.5 ×10^9/L with neutrophils of 7.38 ×10^9/L, platelet count of 363 ×10^9/L, and blood group O positive.

2.3. Therapeutic Intervention

Definitive surgical repair was performed on 4th February 2026. Under general anesthesia the patient was placed in prone position under a radiant warmer. The back was prepared and draped in sterile fashion. An elliptical incision was made around the lesion. The sac was carefully dissected from surround skin edges. The sac was opened and cerebrospinal fluid released in a controlled manner. The neural placode was identified and separated meticulously from surrounding arachnoid adhesions. Neural tissue was tabularized using fine non-absorbable sutures. The Dura mater was mobilized and closed primarily in a watertight fashion using 4-0 vicryl sutures. Fascia and muscle layers were approximated over the repair to provide adequate coverage. Excess sac tissue was excised. Skin was undermined and closed without tension using interrupted absorbable sutures. Hemostasis was achieved throughout the procedure by gauze compression and cauterization with an estimated blood loss of 50mLs.Sterile dressing applied. The patient tolerated the procedure well and was transferred to recovery in stable condition.

On postoperative day one (5th February 2026), in lateral positioning the neonate remained alert and clinically stable. Oxygen saturation was 97% on 1.5L oxygen supplementation and 85% on room air, pulse rate was 122 beats/minute, respiratory rate was 28 cycles/minute, and temperature was 36.9°C. Examination of the surgical site revealed a clean and dry dressing with preserved active lower limb movements. The patient received 25 mL packed red blood cells, iv ceftriaxone 100mg 12 hourly, iv metronidazole 15mg 8 hourly and iv paracetamol 30mg 8 hourly, and wound care. By postoperative day four (9th February 2026), the neonate continued to demonstrate good recovery with no signs of infection, preserved neurological function, and satisfactory wound healing. At discharge review on 13th February 2026, eight days after surgical closure, the neonate remained clinically stable without complaints. Vital signs included oxygen saturation of 96% on room air, pulse rate of 114 beats/minute, respiratory rate of 36 cycles/minute, and temperature of 36.7°C. The surgical wound was healing well, and lower limb activity remained intact.

Photo 2: Condition of a baby after Surgical Intervention

Several favorable prognostic factors were identified in this case, including an intact sac without cerebrospinal fluid leakage, absence of hydrocephalus at presentation, preserved lower limb function, and timely surgical intervention. The case highlighted the importance of early surgical closure to reduce the risk of infection, the value of multidisciplinary neonatal and neurosurgical care in improving outcomes, and the need for long-term follow-up for monitoring neurological, orthopedic, and developmental outcomes. Additionally, the case underscored the importance of antenatal folic acid supplementation in the prevention of neural tube defects.

2.4. Follow-Up and Outcome

The patient remained clinically stable after surgery. Follow-up assessment after two weeks showed:

- Intact surgical wound
- No cerebrospinal fluid leakage
- Improved feeding pattern

The patient was scheduled for continued neurosurgical and wound healing follow-up.

3. Discussion

Myelomeningocele is the most severe and clinically significant form of spina bifida and remains an important contributor to neonatal morbidity and long-term disability globally, particularly in low-resource settings where specialized neonatal neurosurgical services are limited. The present case demonstrates the successful multidisciplinary management of neonatal lumbosacral myelomeningocele in a regional

referral hospital setting in Tanzania and highlights the critical role of timely surgical intervention, coordinated perioperative care, and postoperative rehabilitation in improving neonatal outcomes.

The neonate presented with a large lumbosacral swelling identified shortly after birth. Unlike many severe cases reported in the literature, the patient had preserved lower limb movement, no overt neurological deficits at initial assessment, and no cerebrospinal fluid leakage during early admission. These findings represented favorable prognostic indicators because neurological function at presentation is strongly associated with long-term mobility and continence outcomes (Kliegman et al., 2023). Preservation of neurological status before surgery likely contributed to the positive short-term postoperative outcome observed in this case.

A significant contribution of this case lies in demonstrating the importance of basic but essential surgical skills in resource-limited neonatal settings. Successful repair of myelomeningocele requires meticulous neurosurgical and soft tissue handling techniques, including careful dissection of the meningeal sac, preservation of neural structures, watertight dural closure, fascial reconstruction, and tension-free skin closure. Inadequate closure increases the risk of cerebrospinal fluid leakage, wound dehiscence, meningitis, and long-term neurological deterioration. In this patient, the surgical team achieved successful anatomical closure with preservation of neural elements and satisfactory wound healing without postoperative infection or leakage. This emphasizes that, even in regional hospitals with constrained resources, appropriately trained surgical teams can perform life-saving neonatal reconstructive procedures with acceptable outcomes when standard operative principles are followed.

The case further illustrates the importance of perioperative neonatal surgical care. The patient benefited from preoperative positioning in prone posture, sterile moist dressing of the lesion, prophylactic antibiotic administration, thermal protection, fluid management, and close postoperative monitoring. These supportive measures are critical because neonates with open neural tube defects are highly susceptible to hypothermia, fluid loss, sepsis, and meningitis. The coordinated involvement of pediatricians, surgeons, anesthetists, nurses, and radiology and laboratory personnel demonstrates the value of multidisciplinary teamwork in neonatal surgical management. Such collaborative care models are particularly important in sub-Saharan Africa, where human resource limitations often affect the continuity and quality of specialized neonatal services.

Another important surgical learning point from this case is the timing of intervention. Current evidence recommends early surgical closure of myelomeningocele, preferably within the first 24–72 hours after birth, to minimize infectious complications and further neural tissue injury (Adzick et al., 2011). Although definitive surgery in this case was performed several days after admission due to the need for stabilization and operative preparation, the favorable outcome suggests that structured perioperative management can still reduce complications when immediate surgery is not feasible. This observation is particularly relevant for regional referral hospitals in low-income countries where delays in referral, limited operating theatre access, and shortages of neurosurgical specialists frequently occur.

Hydrocephalus is commonly associated with myelomeningocele and remains one of the major determinants of long-term neurological morbidity. Although this patient did not demonstrate.

From a public health perspective, this case also highlights the preventive importance of maternal folic acid supplementation. Neural tube closure occurs during the first four weeks of gestation, often before many women recognize pregnancy. Delayed antenatal clinic attendance, as observed in this case, may reduce the protective benefit of folic acid supplementation initiated later in pregnancy. Despite receiving folic acid during antenatal care, supplementation may not have occurred during the critical preconception and early embryonic period necessary for neural tube defect prevention. This finding underscores the need for strengthened public health interventions promoting preconception folic acid supplementation, nutrition education, and early antenatal attendance among women of reproductive age in Tanzania.

The case contributes valuable local evidence regarding neonatal surgical care and congenital anomaly management at regional referral hospital level in Tanzania. Published literature describing neonatal myelomeningocele management from regional hospitals in the country remains limited. Documentation of such experiences is important for strengthening surgical training, improving neonatal referral pathways, informing policy discussions on congenital anomaly services, and supporting investment in pediatric surgical capacity building. The successful outcome observed in this patient demonstrates that improved neonatal surgical outcomes are achievable in resource-constrained settings through timely referral, adherence to surgical principles, multidisciplinary collaboration, and structured postoperative care.

4. Conclusion

This case highlights the importance of early diagnosis, prompt referral, multidisciplinary surgical management, Strengthening maternal folic acid supplementation programs and improving access to specialized neonatal surgical services are critical in reducing the burden of neural tube defects in Tanzania.

5. Patient Consent

Written informed consent was obtained from the patient's parent for publication of this case report and accompanying clinical information. Confidentiality and anonymity were maintained throughout the report.

6. Acknowledgement

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7. Conflict of Interest

The authors declare no conflict of interest.

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